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Review Article

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Tropical Phytotherapeutic Treatment For Achieving Knee Symmetry In Osteoarthritis – A Sustainable Approach

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Abstract

Throughout the world a large number of patients suffering from osteoarthritis are undergoing knee surgery and knee replacement every year. Though the surgery or replacement methods are expensive , these cannot make both knees symmetrical in all anatomical measurements.The present paper , reports for the first time , a noble method ,alternative to knee surgery by topical applications of phytoconstituents.The treatment involves topical applications of phytoconstituents from medicinal plants by manually applied with wooden roller and pluse-therapy technique for a period of 42days. The patients recover completely from osteoarthritis pain and both their knees become symmetrical anatomically , supported by pathological and radiological observations.

Keywords: knee symmetry, knee surgery, phytoconstituents , phytomecdicine.

Introduction

By the year 2030 it has been predicted that 3.48 billion primary total knee replacements will be performed annually in the USA. (1)
Knee osteoarthritis was historically considered an "asymmetric "disease and most research countries to focus on each joint as single entity. Cross sectional studies have shown that bilateral knee pain is a frequent problem in the community (2, 3)
The aim of arthroplasty (knee surgery) is to make both knees pain free and symmetrical, but such never happens .Various factors have been proposed as possible sources of dissatisfaction, including instability (4-8)
In the present study it is being reported for the first time that topical applications of certain extracts of Indian medicinal plants are capable of making both knees symmetrical in all anatomical measurements in a period of 42 days in patients suffering from osteoarthritis , in both sexes, ages between 46to 60 years and above .This could be a noble way of treating arthritis patients without knee surgery.

Materials and Methods

Experimental Settings

A total of 105 patients of age group 46- 60 years and 60 years and above were physically examined and observations were noted before the treatment protocol starts in support of anatomical conditions such as past treatment histories in order to analyze and justify the present condition of legs and back muscle structure and examining if the knee caps are used or not, whether in past or presently taking the pain killers, intervenous injection etc. Measurement of knee gap between biceps femoris, short head and the level of the bed, diameter of muscles, 4 cm above and below the knee joint and calf muscles are taken and also angles of reflexion in supine, prone and standing positions and angles of extension in supine, prone and standing positions are taken(9,10) .
Radiological reports of both the knee joints and lumbo sacral spine (L.S. spine) were examined, pathological examinations like activities of muscle creatine phospokinase (CPK), C – reactive protein (CRP) and aldolase were measured.
The therapy mainly works with the phytochemicals present in leaves, flowers, fruits, stems, barks, roots and seeds of the plants extracted with water.
Phytoextraction of following Indian medicinal plants were made (water extract)at 4 C:
Cissus quadrangularis
Heliotropium indicum
Rose marry
For topical applications the water extracts (powder forms) are solubilised sesame and castor and wax to make paste.

Aims, Principles and Theories

It is a holistic and independent system of treatment with its own philosophy, pharmacy, pharmacopoeia and examination procedures which leads to a permanent solution from pain without use of any oral medicines (pain killers and painaids) within maximum period of forty two days of sittings in the clinic six days a week subject to physiological manifestation.
The therapy aims to improve the basic cellular and molecular behaviours, the pulsing and impulsing systems, lymph and blood circulatory systems, the digestive and excretory systems of the body by assessing the cause of disorder at the cellular and molecular level, as opposed to the conventional medical approach of treating and suppressing symptoms at the organ level.

The therapy is framed based on well defined principal and theories such as – scientific fomentation theory, connective tissue massage theory, spine and joints manipulation theory, identification of intoxicated food habit theory, enhancement of impaired pulsing and impulsing systems through electronic muscle stimulator operated by 9 volt DC battery, effect of the joint stimuli theory, muscle re – education theory, and counselling.

Unique herbal fomentation device for the treatment of disease like Spondylosis (cervical & Lumber) Slip disc etc working by applying slow uniform heating upon the affected portion of the body maximum at range of 106 F (41 C) is comprising of two parts, one (section – A) is mainly comprising of electromechanical component and second one (Section – B) is full of herbal poultices, wherein the first one (Section – A) is comprising of different cloths such as thick buckram cloth (i), Two glass cloths (ii), Two soft mica sheets (iii), fine buckram cloth (iv), duly stitched (v) by machine and gaps/ channels (vi) between machine stitches are maintained for the insertion of the prepared coil with china glass tube, wherein the second part (Section – B) is comprising of medicated cloth sheet of poultices (vii) like herbal raw juices, salts, powders, gums, sands, oils and others composition. The other aspect of the invention is the process of producing the device.

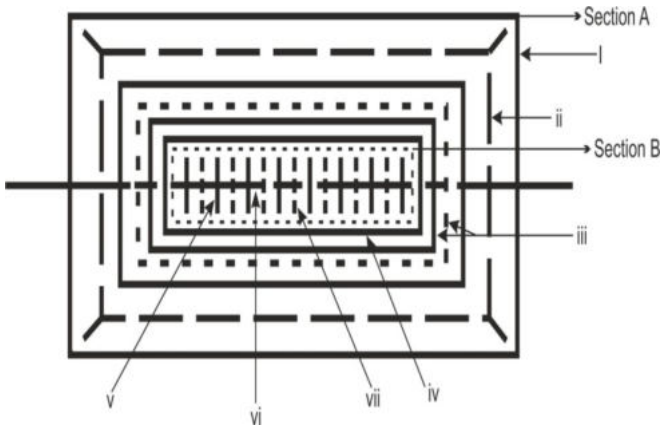


Figure-1

Warm gaseous herbal substances from herbal fomentation device (Figure 1) used externally with well defined techniques and that they pass through the cell membranes of the skin and penetrate its deepest layers by diffusion process and travel to the various tissues, glands and organs of the body.

Highlights of Treatment

Stiffness of muscles can be reversed, muscular wasting can be repaired, inflammation of joints can be reduced without any chemically composed drugs, calcification / de- generation can be rectified, muscular strength can be increased, supporting belt on waist or knee joints are not required from the day one of the treatment, no bed rest is required, gaps between bones / vertebrae can be increased, reduction of genu varum (an exaggerated bending outward of the legs from the knees down that causes the knees to be spread apart when the feet and ankles are touching) is obtained,extraction of the fluid accumulated in the knee joints is not required and dependence on pain killers or steroid can be withdrawn from the day one of the treatment.

Treatment Protocol

In the clinic, with the help of theories of chemical, mechanical, thermal and electrical stimuli – the muscle strength and blood circulation of different organs are enhanced. For the chemical stimulation, the phytochemicals are extracted from medicinal plants (as mentioned before) as 'water extraction' and then mixed with oils at 4 C without using any preservatives or chemicals, so that the phytochemical properties of the plants are preserved. This entire process is executed on seasonal basis when the phytochemical components are present in the particular plants at optimal level, as because all the plants do not have medical values throughout, i.e; composition of phytochemicals do not remain in the plants throughout the year, it has specific, time, age, season and environment. The paste of two oils and cream in equal ratio is to be applied on skin from upper part of the back region to down to the toes, with a patient lying on prone position as well as from the groin to toes lying in supine position with circular motion with the help of tip of three fingers - as a result the necessary phytochemicals of the paste can easily penetrate through the enlarged pores of the skin by diffusion process and travel to various tissues, glands and organs of the body and reach upto the bone levels. Again with the help of extrothermic exergonic reactions(a type of chemical reaction), architecture and the metabolic processes of contraction of the muscle is achieved by phytochemicals – subject to tetanus(occurs when a motor unit has been maximally stimulated by its motor neuron.) of muscles. Therefore, immediately after contraction is released, the blood flow increases considerably and oxygen supply is greater than in the resting condition of muscle, because muscle converts chemical energy into mechanical energy. For the mechanical stimulation, muscular contraction in the body is usually evoked by nerve impulses arriving at the end – plates i.e; the places in the muscles where the naked axon of motor nerve ends by piering the sarcolemma of the muscle. Thus, the tetanus in the muscles rise due to the mechanical phenomena.(12)

Front View

Back View

Figure -2

The transverse wave has been developed with the tips of three fingers manipulation as well as by a wooden device (Figure 2) developed for this purpose with 'connective tissue massage theory' and 'spine and joint manipulative theory'. The wooden device is used in order to avoid the production of static electric current which is produced due to hand manipulation of the skin surface and also to maintain the uniform pressure over the compressed nerve roots. Therefore, the uniform transverse connective tissue massage by way of mechanical stimulation helps to stimulate blood circulation thus making stiff and aching muscles relax and also to disperse any coagulated blood or effusion which might be present in the affected area(s). Moreover, a large number of tissues and functional systems are only slightly or not at all sensitive to a single stimulus unless otherwise they are applied repeatedly and for sufficient time jointly with chemical and mechanical stimuli. The application of paste(chemical) with the help of tips of three fingers and wooden device (mechanical) serve this purpose as the main functions of the spinal cord, which is composed of two kinds of nervous pathways – sensory and motor, are conduction of excitation (nerve impulse) and the reflex actively. The impulses are transmitted to the spinal cord from the periphery (i.e; skin,muscles, etc.) along the ascending pathways to the brain. The lumber and sacral segments of the spinal cord contain the centres of the pelvic muscles and muscles of the lower extremities.

During the course of the research, it has been detected that the uniform, slow, steady and progressive increase of heat upto a particular degree of temperature (as opposed to the sudden and irregular heat generally applied) provides healing and effective from the aches and pains because it alters the local bl ood flow and dissipates the pains, since the pathways of the thermal signals and pain signals are almost same. Therefore, the thermal stimulations, it has been designed a pad ,the number of pads are wrapped from the origin to the insertions of all muscles affecting the movement of knee joints in different positions such as supine position, prone position, right and left contra lateral positions, over the skin, after the application of paste of two oils and cream in equal proportion according to the quantum of damaged muscles within the maximum limit of control temperature at 106 F(41 C) passing through various mediums created in the pad. In case of thermal changes of muscular contraction, heat is produced in the course of muscle activity into two phases i.e; Initial heat (12) which is produced during mechanical response in a single twitch and is composed of heat of activation, heat of shortening and heat of maintenance and recovery heat (12), which is produced after mechanical response is ended at low rate and for a long time.

In the absence of oxygen, the heat of recovery is diminished, but in the presence of oxygen, the total recovery heat is equal to sum of total initial heat and work done. Moreover, the total energy liberated in a muscle twitch (E) equal to sum of activation of heat (A), work done (W) and the heat of shortening (ax). This relation is true for the whole of contraction and for any part of it. Moreover, considering the various aspects of stimulation of muscles such as local excitatory state, propagatory excitatory state, accommodation, later addition, chronaxie, frequency of stimulation, respective excitability, wednesky, inhibition and refractory period, the combined stimuli of chemical (paste) and thermal (through designed pads) are applied in order to achieve the optimal functional behaviour of muscles and tissues.

For electrical stimulation, when a low frequency electrical current of the same quantity as the electric current of the same quantity which flows in the human body is given into the body by a low frequency micro – computerized muscle stimulator run by a battery of DC 9 volt having frequency of 1.5 – 75 Hz,strength of 10^0 with 6 kinds of stimulations patterns such as pound (heavy, beating sensation), rub, beat, massage, slacken and pound (tapping sensation). The nerves are stimulated, the muscle movements are arisen and blood flow is promoted.

Moreover, it is observed that after stimulation, there is a brief period during which muscle is not excitable to second stimulus. Therefore, in the first phase of treatment, the paste of two oils and a cream composition of phytochemicals is applied (produce chemical stimulation) on the skin and mechanical transverse wave by way of vibration with the help of tips of three fingers manipulation and wooden device (produce mechanical stimulation) and wrapping the affected portion with flexible pads which produce thermal stimulation and then wait for sometime for second phase of treatment. In the second phase of treatment, micro – computerised muscle stimulator operated by a small battery cell of DC 9 volts (produce electrical stimulation) simultaneously. Thus the chemical (paste) , mechanical (transverse wave by vibration), thermal (heat) and electrical (micro – computerised muscle stimulator) stimuli are applied on various connective tissues through the skin, simultaneously, in order to stimulate muscles, blood flow etc and to nourish the tissue cells. These also help to disperse coagulated blood or effusion which might be present in the affected area of the patient.

Three times a day, the paste of two oils and cream (combination of phytochemicals) in the equal ratio to be applied in the same manner as applied in the clinic. The interval between the two application should be minimum two hours but the application of the paste should be strictly followed three times a day in prescribed quantity, in case of one sitting is taken in the clinic and the next two

times is mandatory at home or otherwise three times a day is compulsory at home with a minimum interval of two hours.

Results and Discussion

Figure 3: Knee gap between the short head of biceps femorous and the bed (cm) of Osteoarthritis patients between 0 day (day one of treatment) to 42 days of treatment

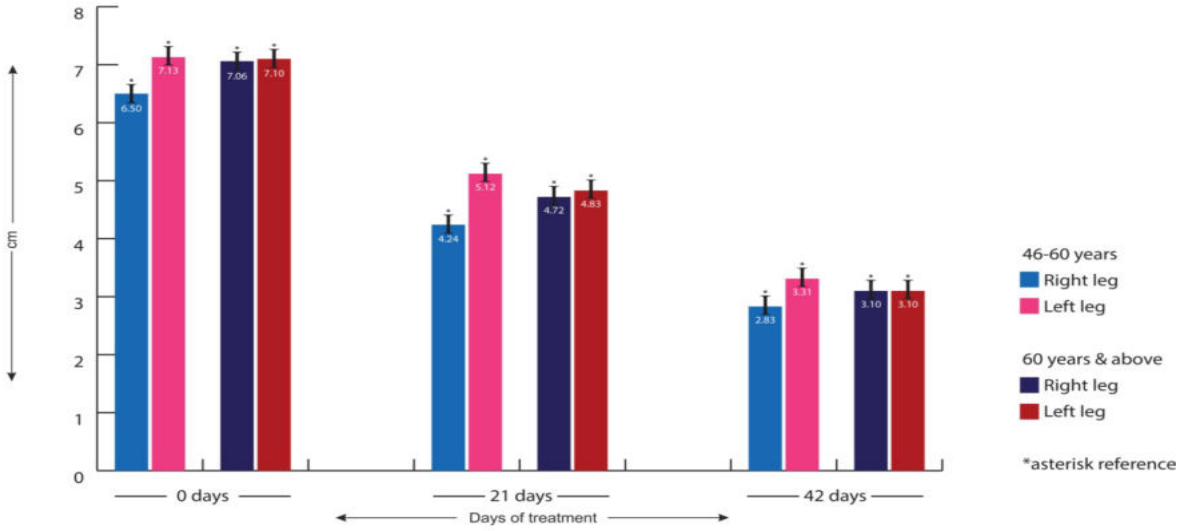


Fig 3 - Shows knee gap

Total no of 30 patients suffering from Osteoarthritis were treated
Bar represents Mean ± Standard Diameter , * (P < 0.05)

Figure 3: shows knee gap between short head of biceps femoris and the bed. It is seen from the figure that on 1st day of treatment(0 sitting/day) there are gaps of 5-6 cm of each patient which on subsequent days of treatment, 21st day and 42nd day are reduced. On 42nd day gaps between bed and both knees are markedly reduced and became symmetrical for both knees. The figure represents patients of different age groups of either sex.

Figure 4: Diameter of group of muscles connected with Knee joint

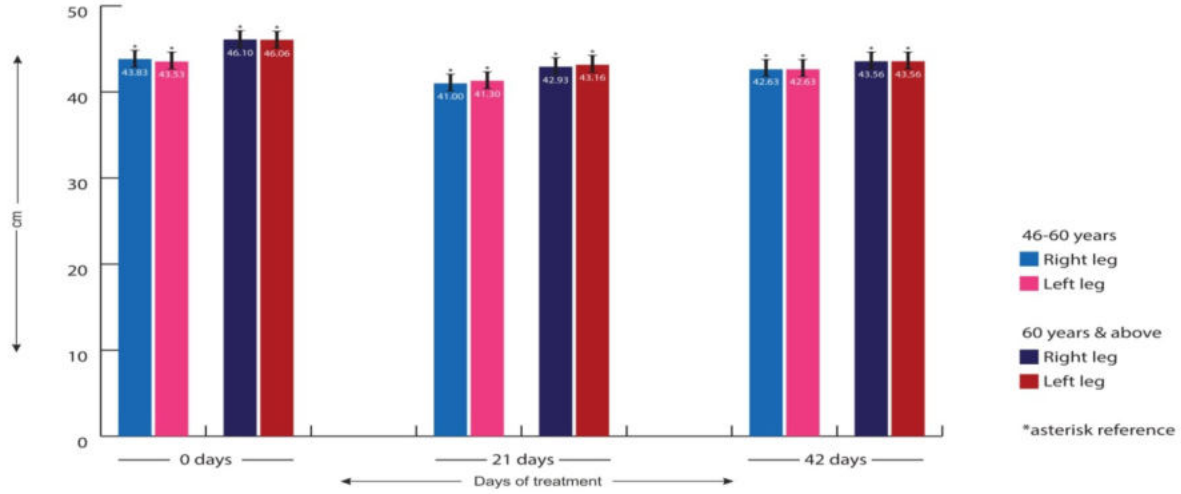


Fig 4 - Shows measurements in cm 4 cm above patella

Total no of 30 patients suffering from Osteoarthritis were treated
Bar represents Mean ± Standard Diameter , * (P < 0.05)

Figure 4: represents diameter of group of muscle connected with knee joint , 4cm above the patella for both knees . Patients suffering from osteoarthritis have difference between diameter of the group of muscles with knee joint for two knees .But with treatment between 0-42days , improvement of muscles take place and on 42day both legs become symmetrical in measurements . The figure represents patients of different age groups of either sex.

Figure 5: Diameter of group of muscles connected with Knee joint

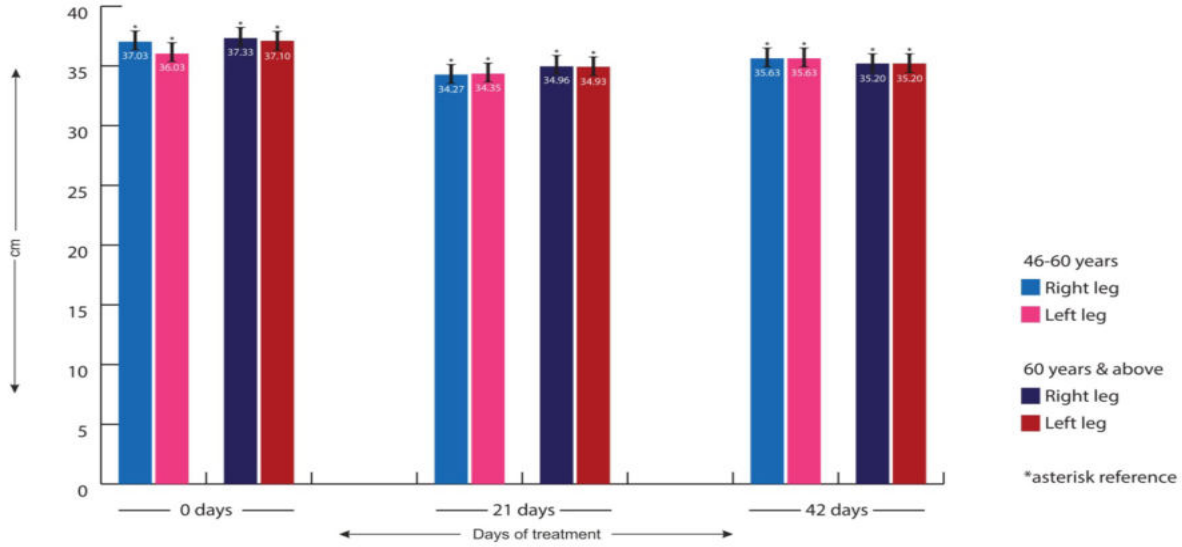


Fig 5 - Shows measurements in cm 4 cm below patella

Total no of 30 patients suffering from Osteoarthritis were treated
Bar represents Mean ± Standard Diameter , * (P < 0.05)

Figure 5**:** represents the same measurements for 4 cm below the patella with similar observations.

Figure 6: Diameter of the Calf muscles (Gastro cneminus) in cm

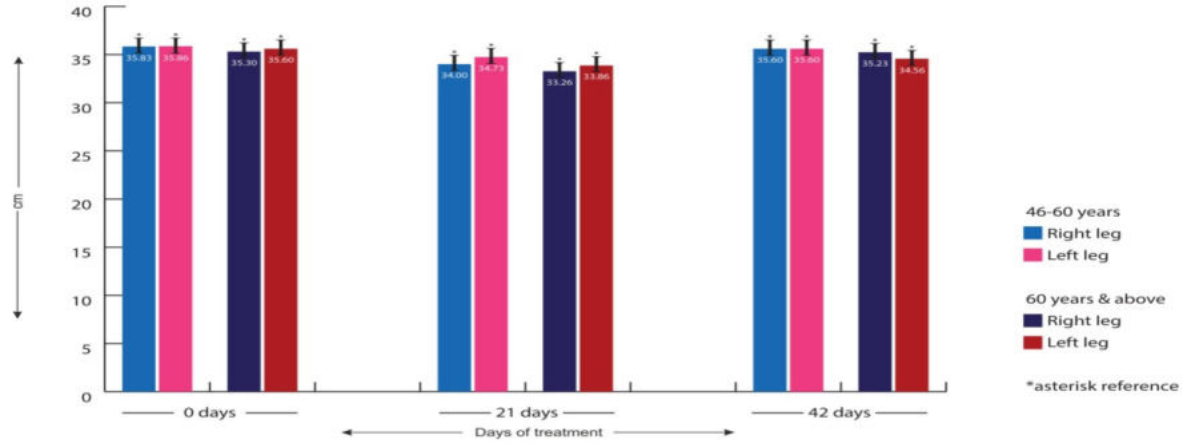


Fig 6 - Shows diameter of the Calf muscle at the middle

Total no of 30 patients suffering from Osteoarthritis were treated
Bar represents Mean ± Standard Diameter , * (P < 0.05)

Figure 6: represents diameter of calf muscle of different patients between 0 day and 42nd day of treatment. It is observed that diameter of calf muscle of both legs which were different at the beginning of treatment become symmetrical on 42nd day; the figure represents patients of different age groups of either sex.

Figure 7:Knee Flexion at Supine position

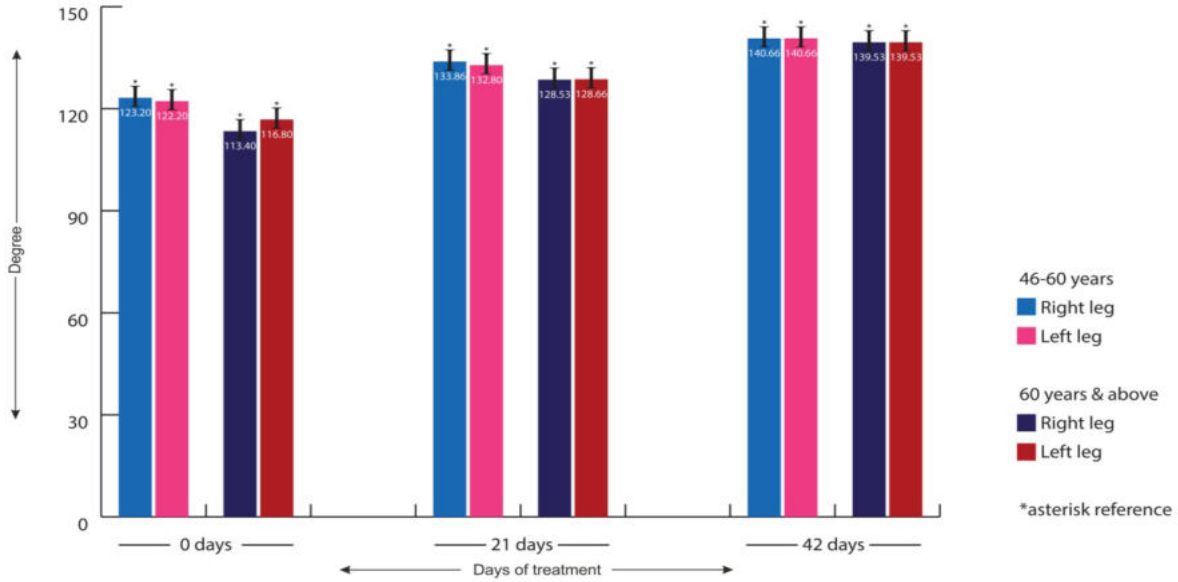


Fig 7 - Shows knee flexion at Supine position of Osteoarthritis patients

Total no of 30 patients suffering from Osteoarthritis were treated
Bar represents Mean ± Standard Diameter , * (P < 0.05)

Figure 7: This represents symmetry of knee joint movement, flexion in supine position with days of treatment. The figure shows marked improvement of knee flexion in supine position from commencement of treatment and become normal after 42days of treatment .Here normal means person with knee flexion in supine position between 140-145 .

Figure 8: Knee Flexion at Prone position

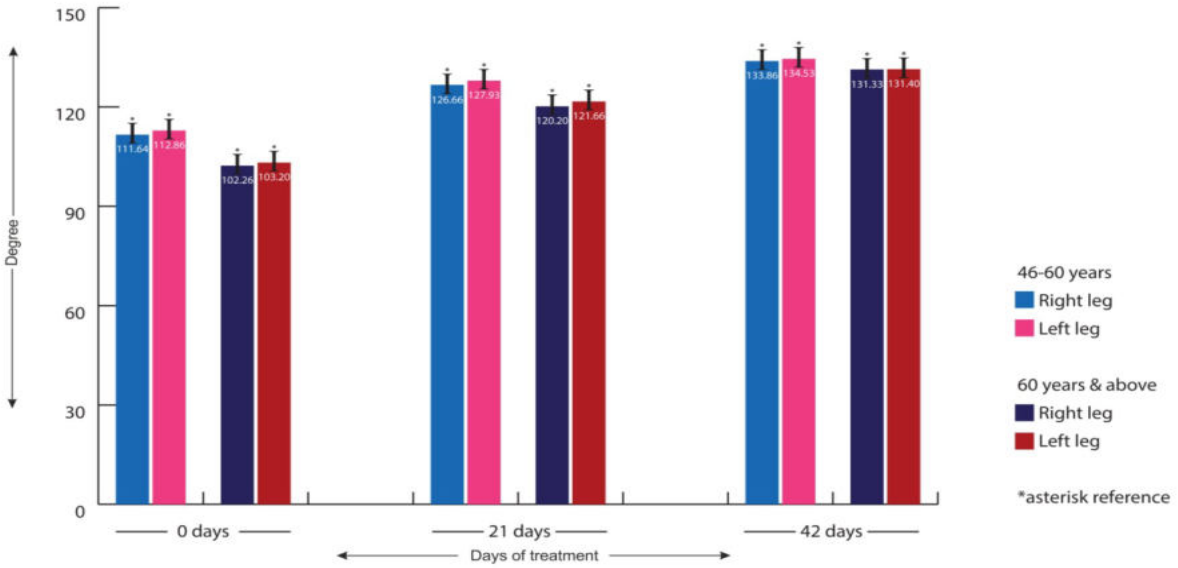


Fig 8 - Shows knee flexion at Prone position of Osteoarthritis patients

Total no of 30 patients suffering from Osteoarthritis were treated
Bar represents Mean ± Standard Diameter , * (P < 0.05)

Figure 8: Shows symmetrical of knee joint movement, flexion in prone position with days of treatment. The figure shows marked improvement from commencement of treatment and become normal after 42days .Here normal means person with knee flexion in prone position between 130-135 .

Figure 9:Knee Flexion at Standing position

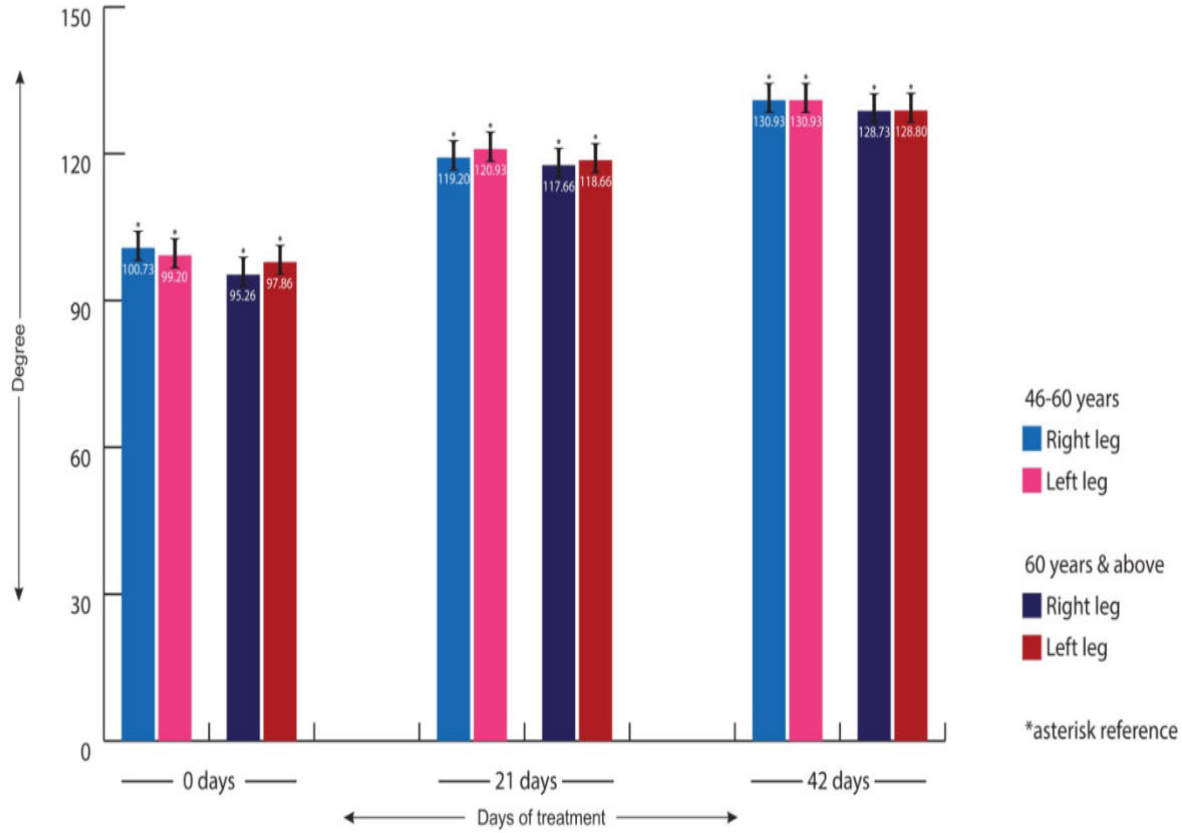


Fig 9 - Shows knee flexion at Standing position of Osteoarthritis patients

Total no of 30 patients suffering from Osteoarthritis were treated
Bar represents Mean ± Standard Diameter , * (P < 0.05)

Figure 9: represents symmetry of knee joint movement, flexion in standing position with days of treatment. There is marked improvement of knee flexion in standing position from 1st day treatment and become normal after 42days of treatment. Normally knee flexion in standing position varies between 130-135 .

In the following figures (10-16) 6 individual patient's measurements have been presented giving measurement from commencement of treatment with 7,14,21,28,35,42 days of treatment. The changes are highly distinct showing symmetry in each case.

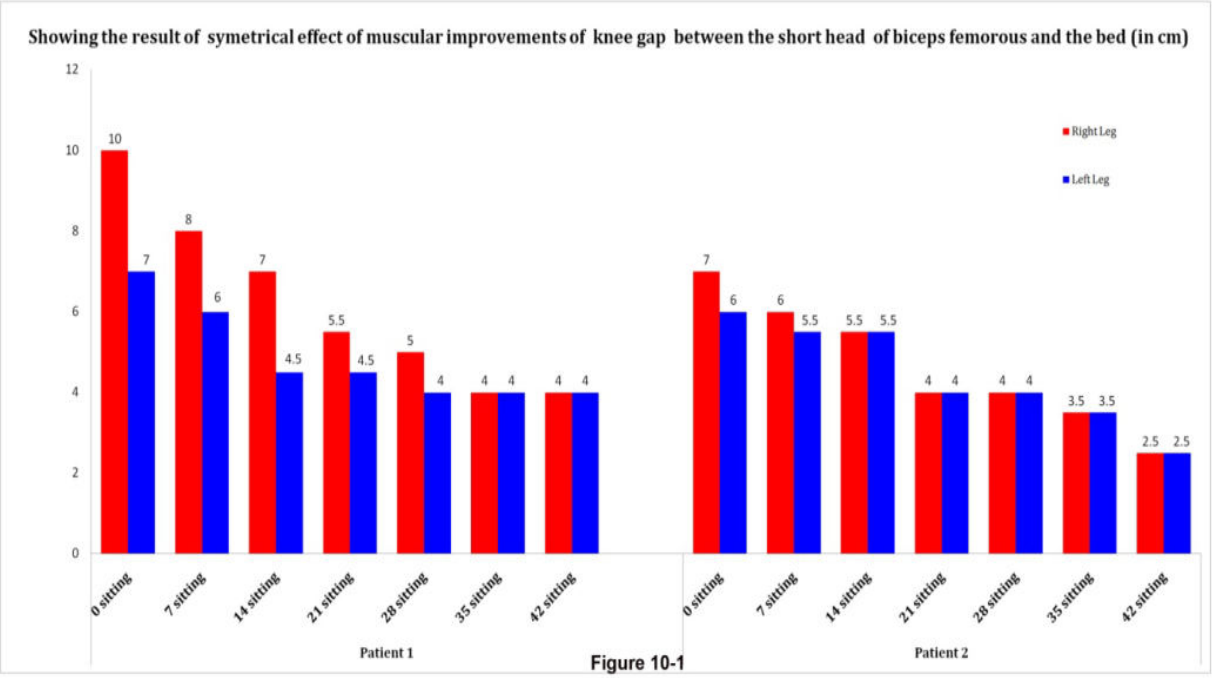


Figure 10-1

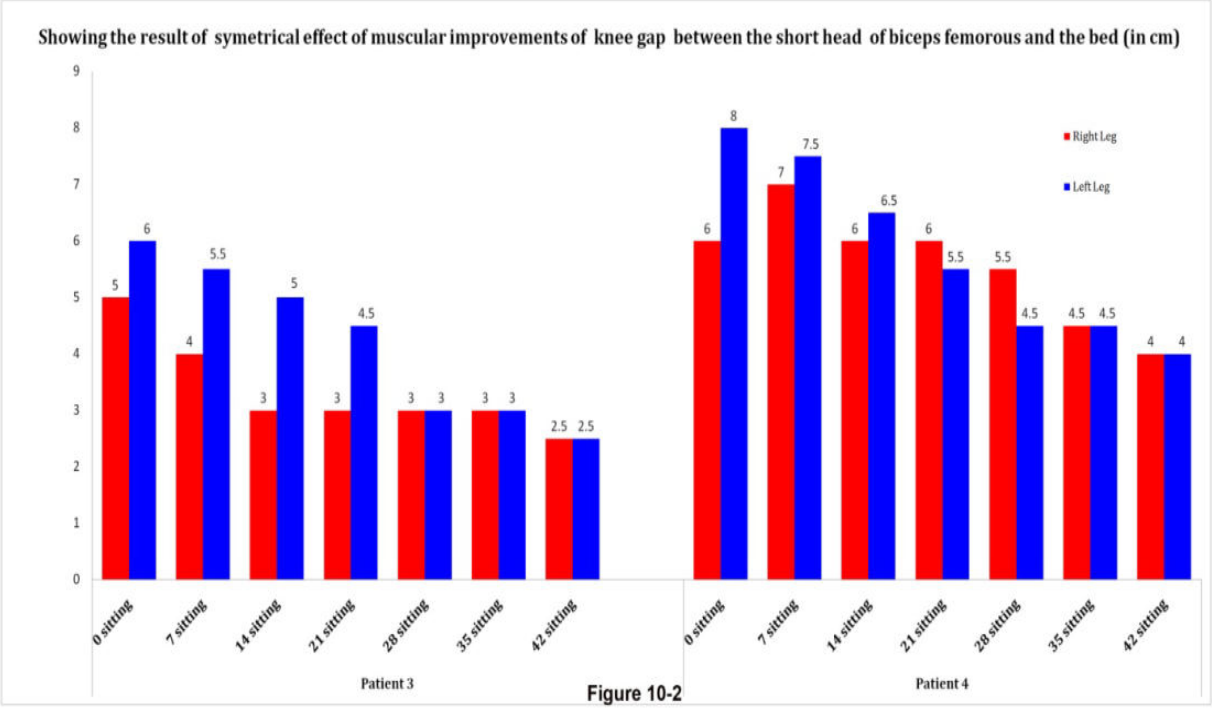


Figure 10-2

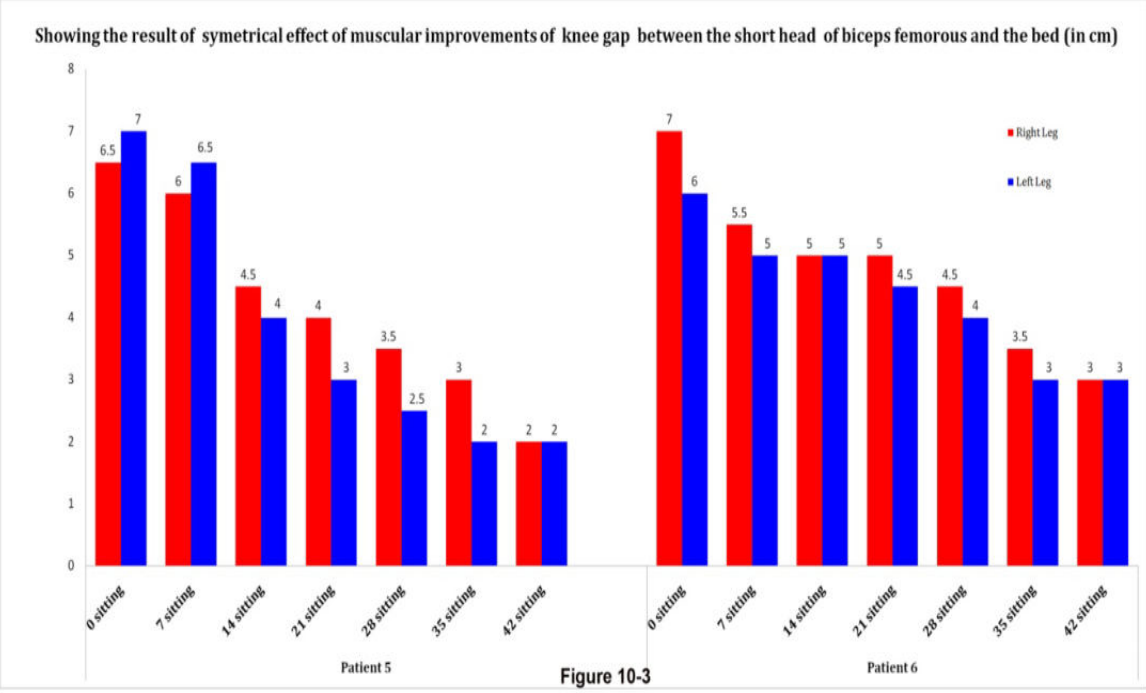


Figure 10-3

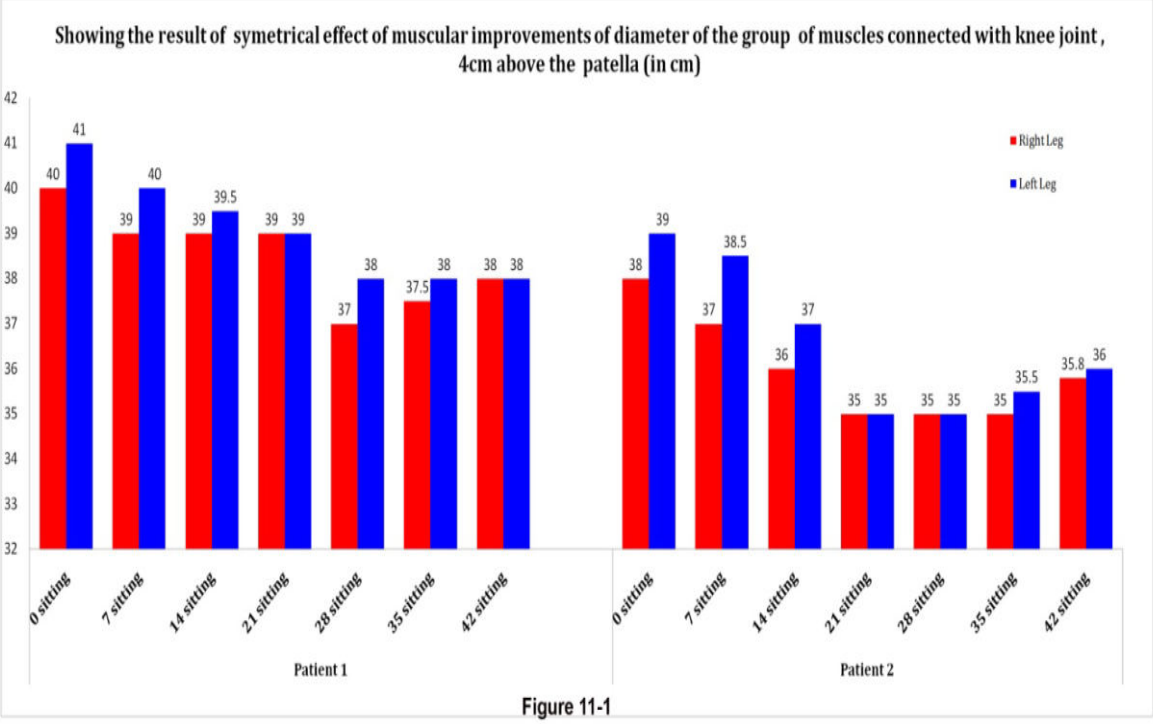


Figure 11-1

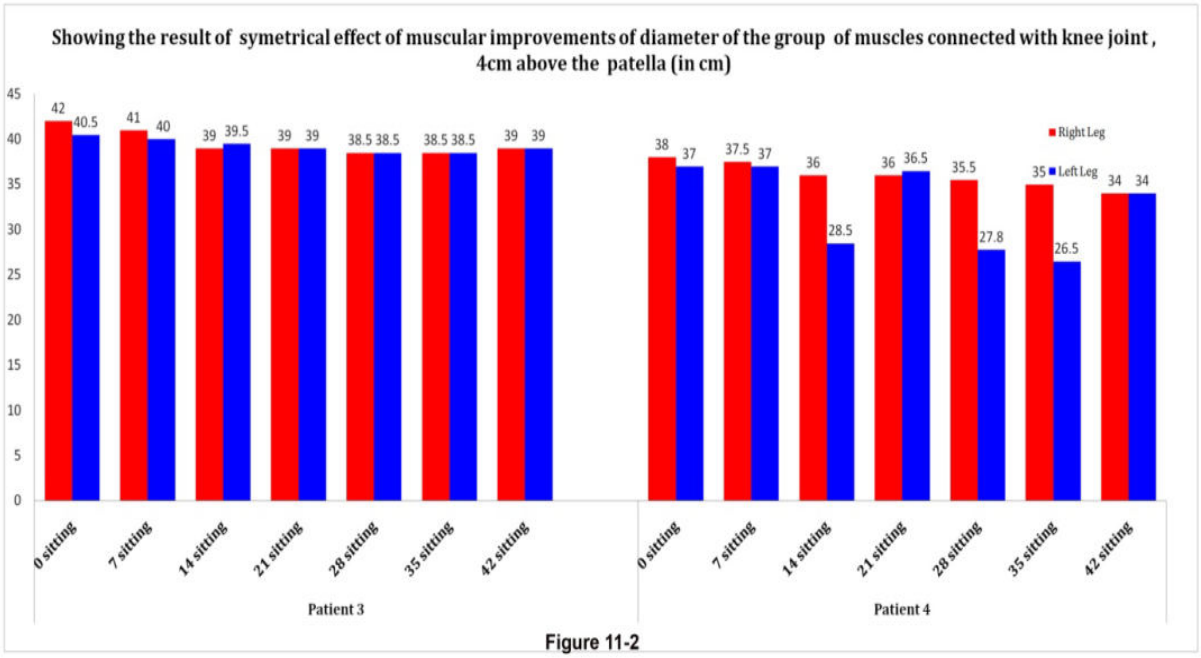


Figure 11-2

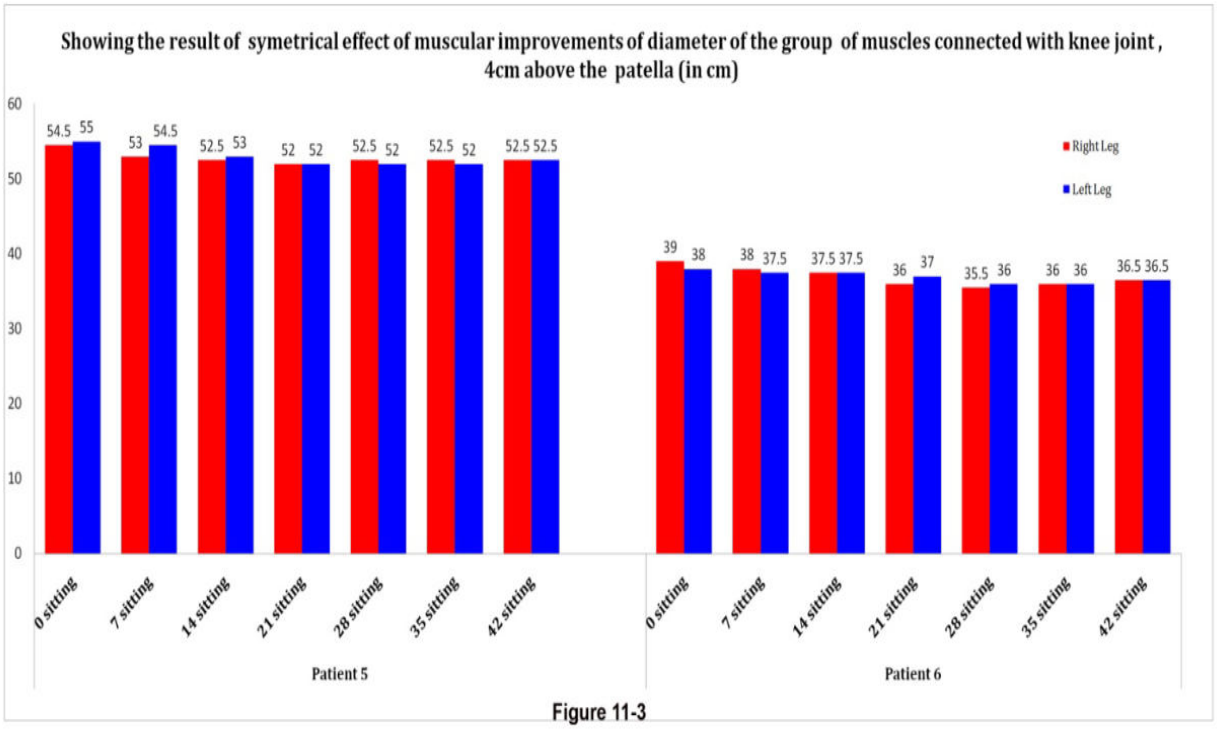
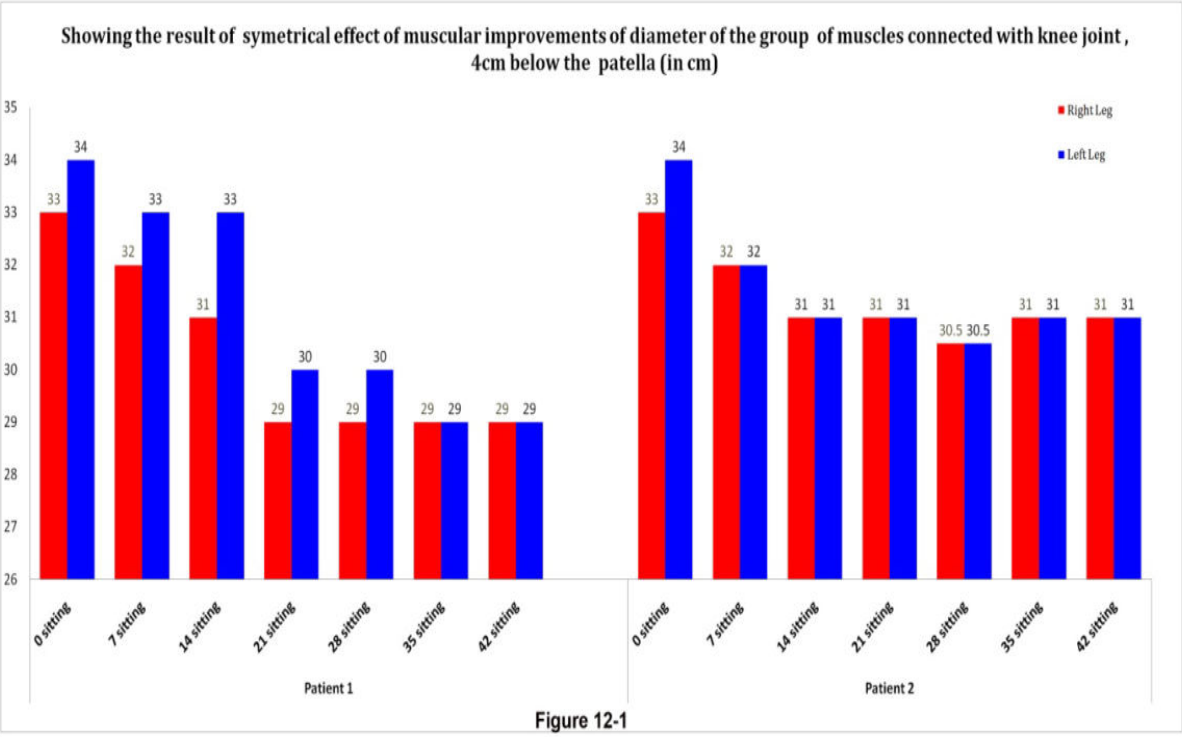


Figure 11-3



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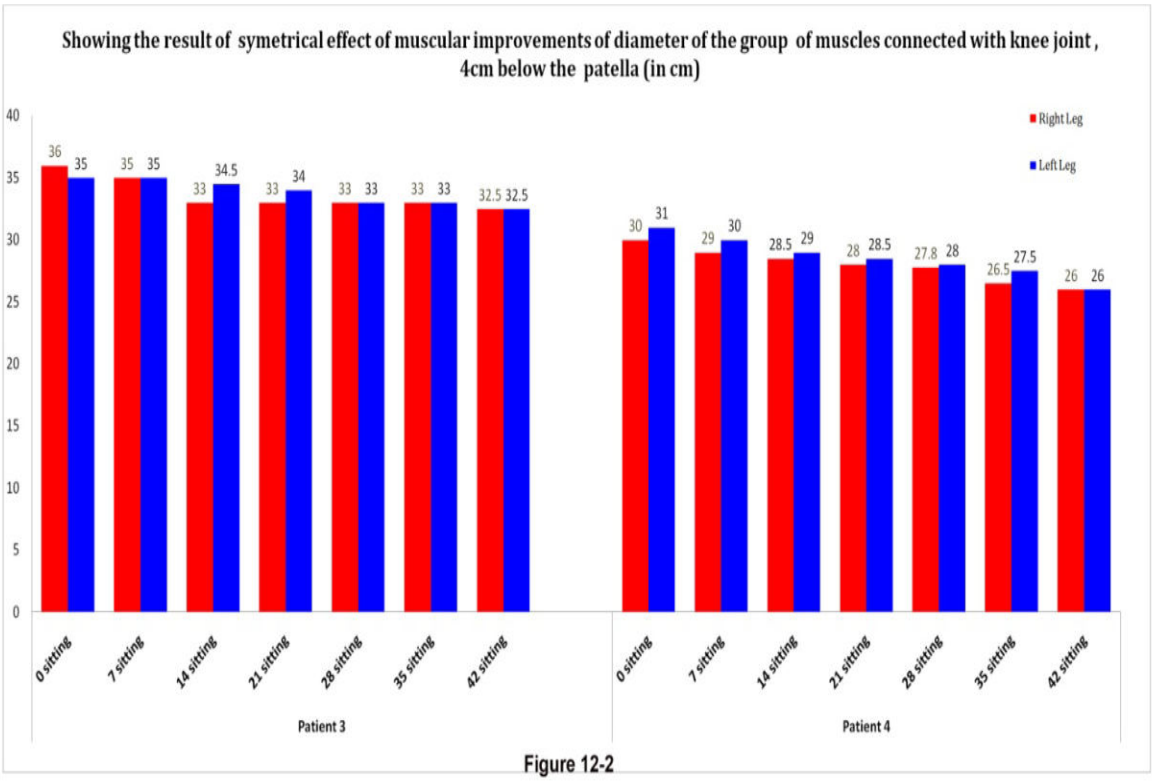

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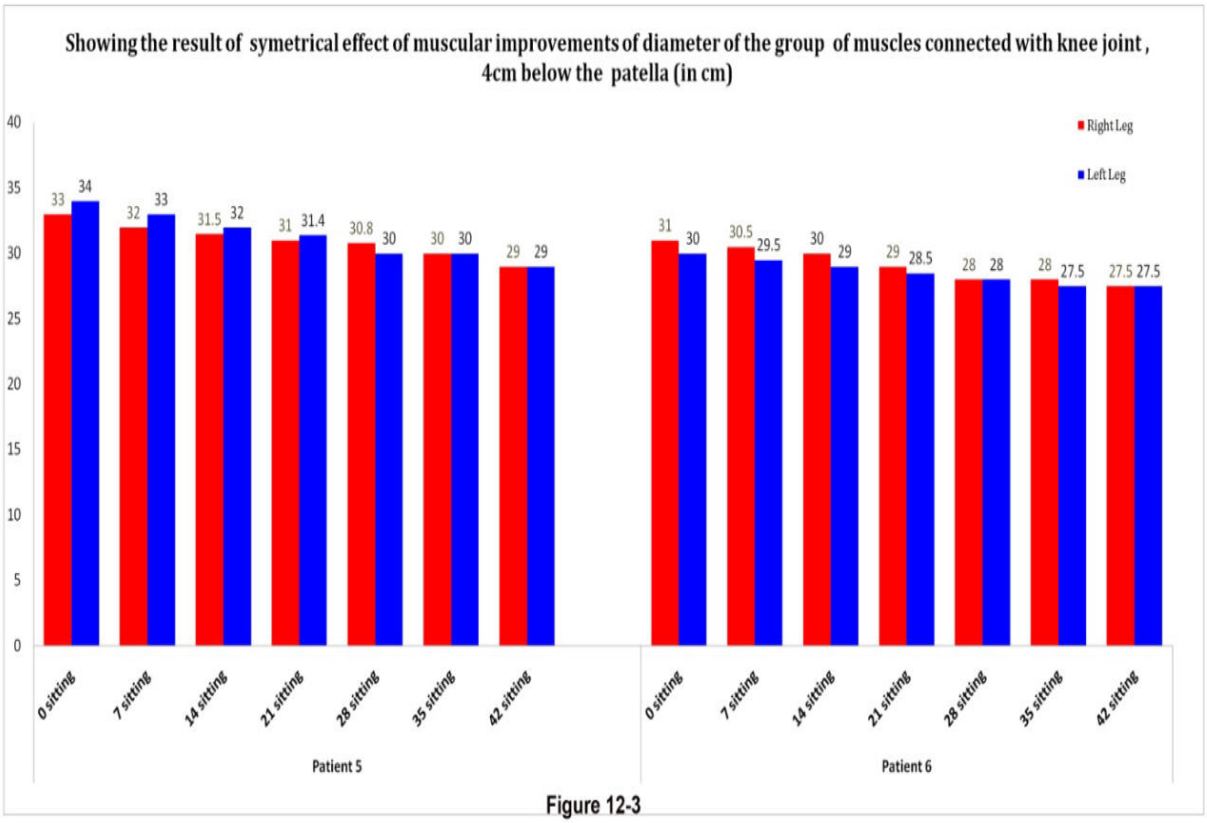


Figure 12-3

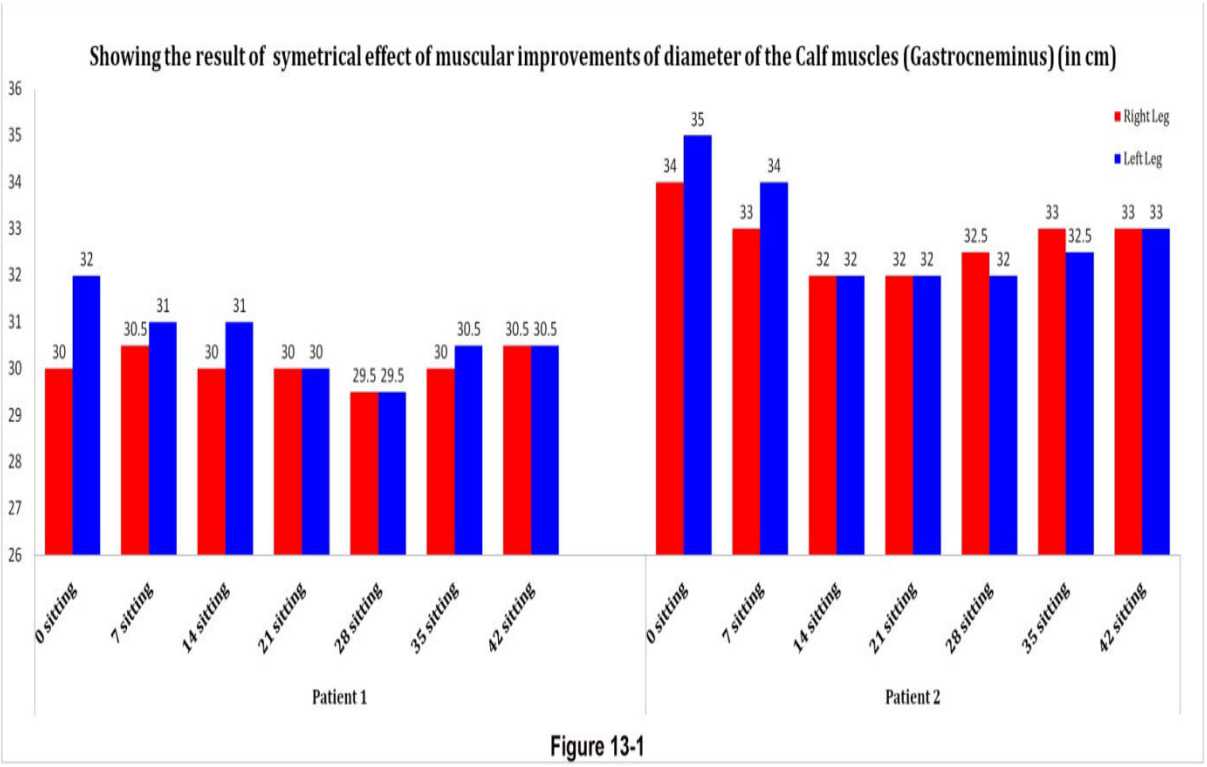
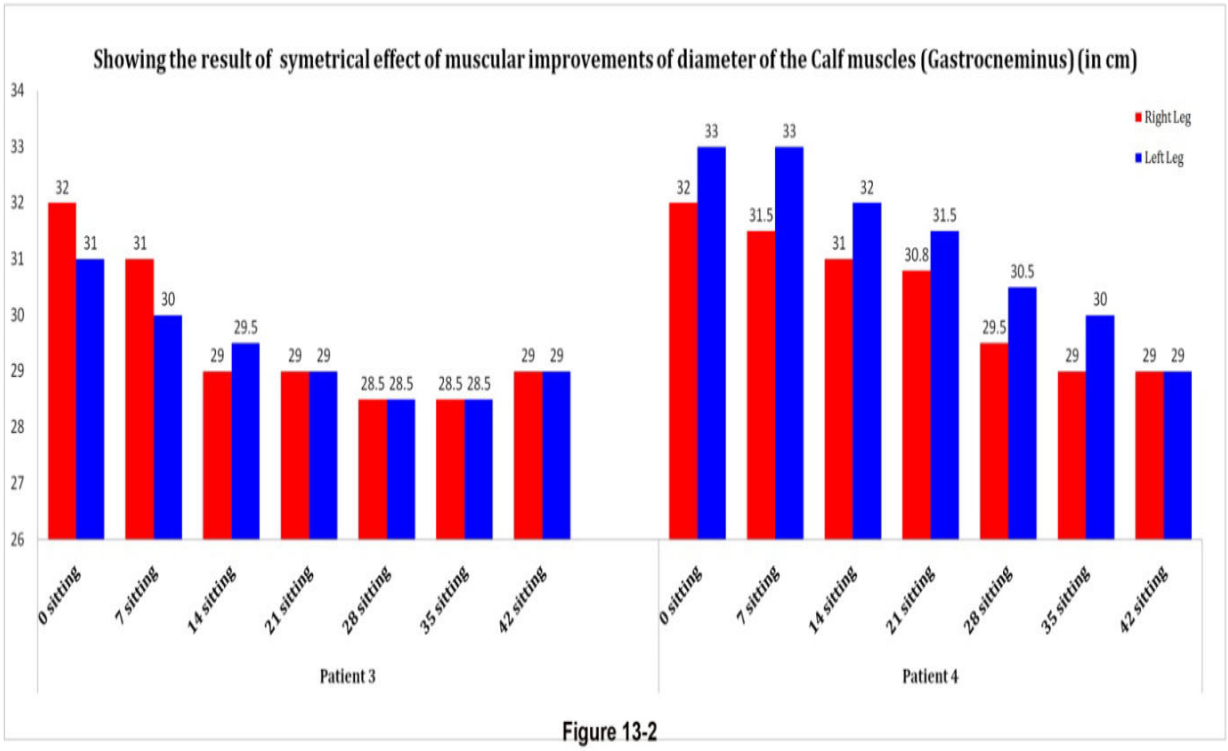


Figure 13-1



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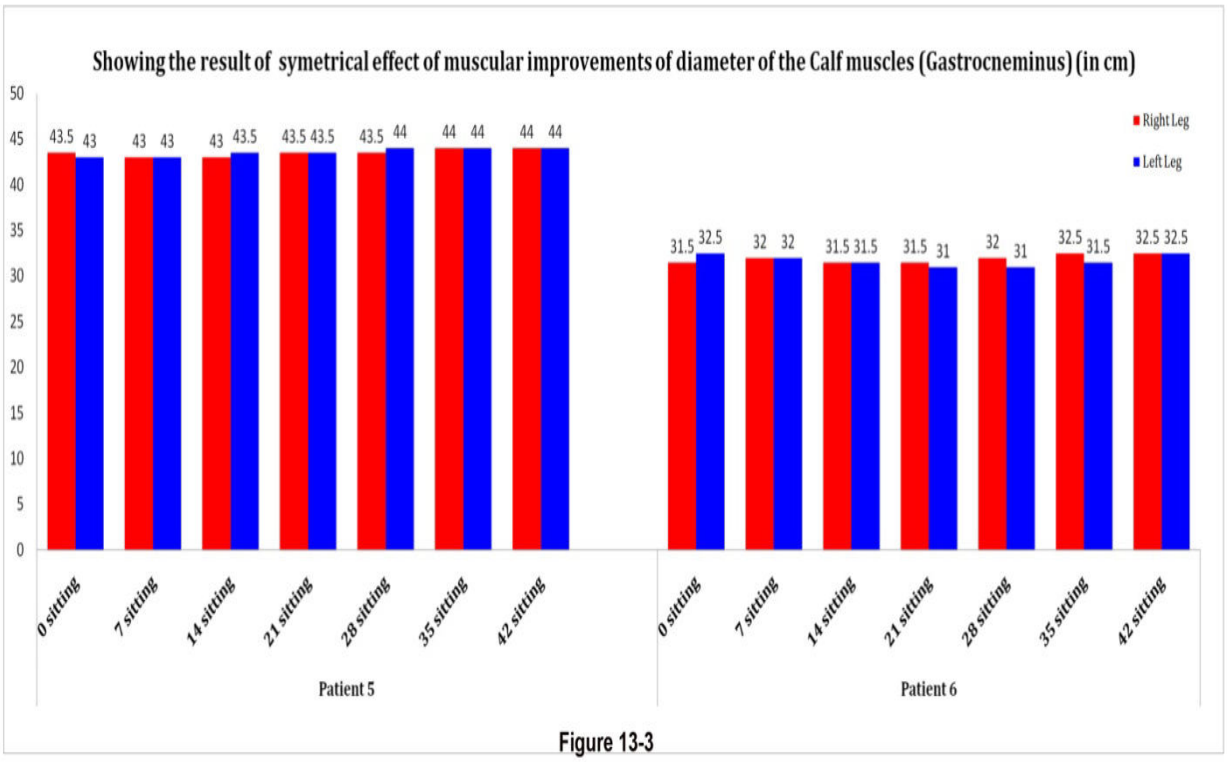
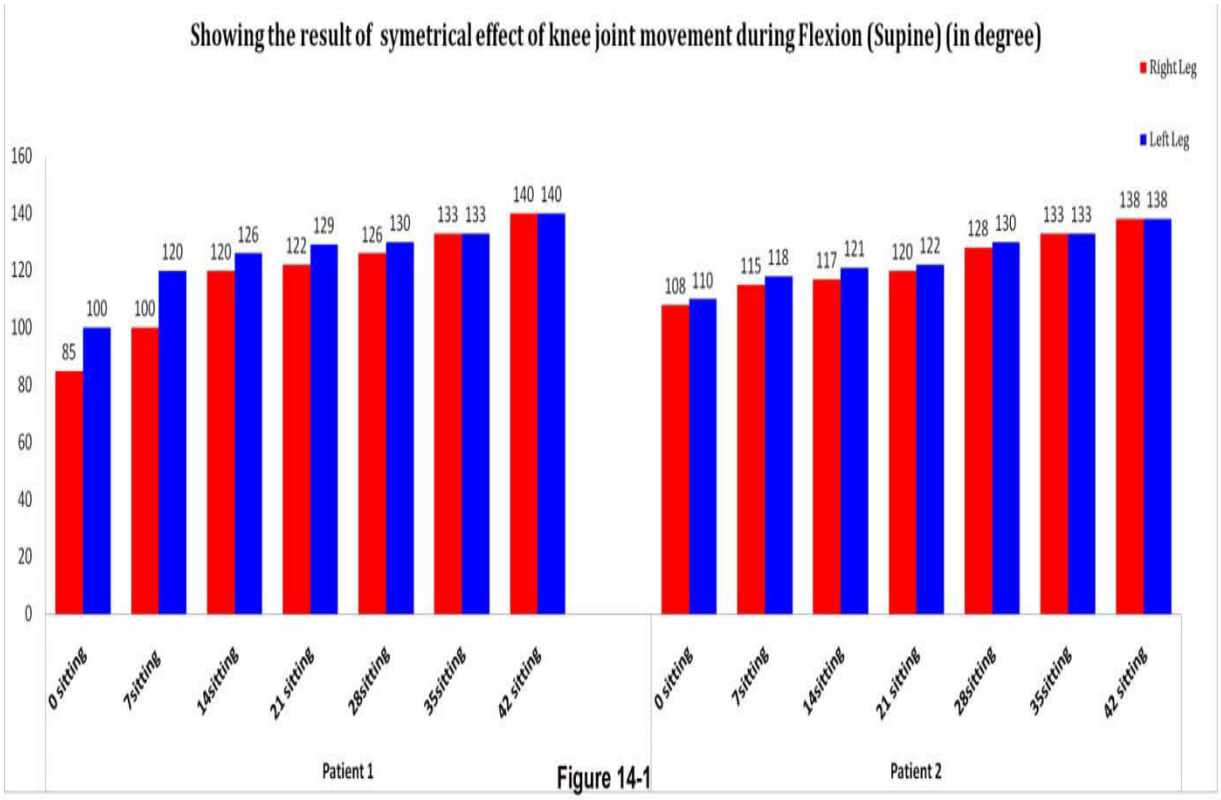


Figure 13-3



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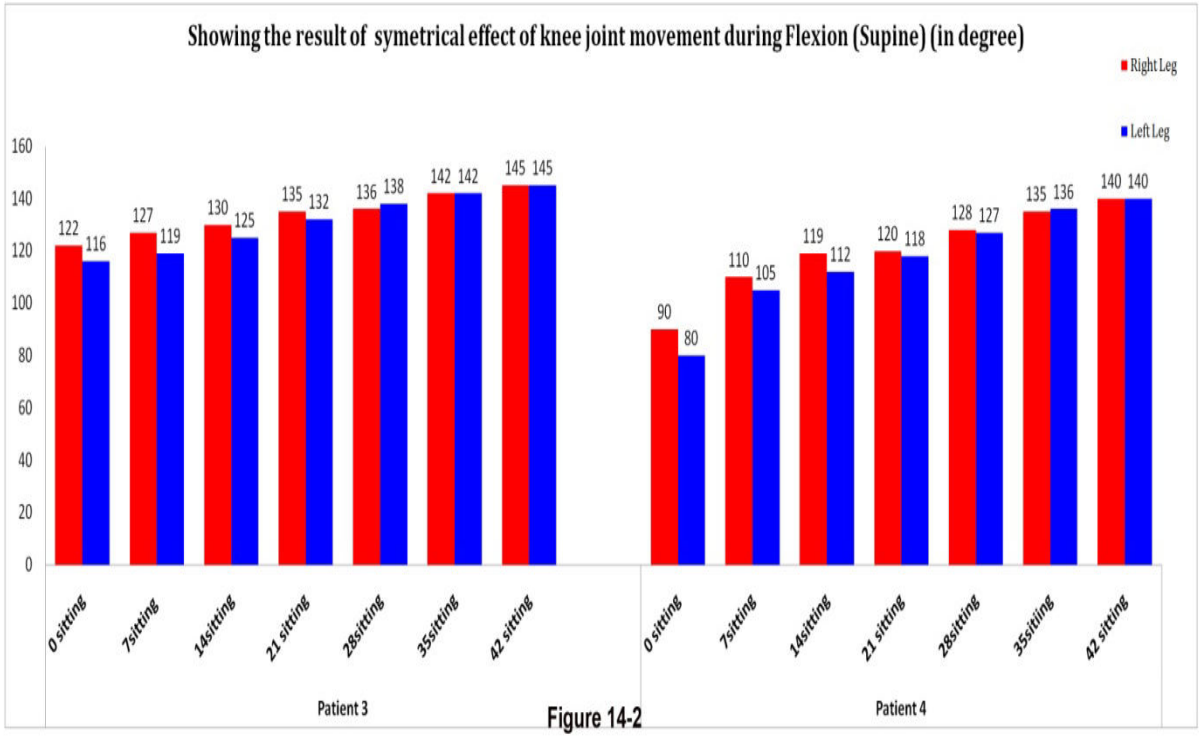

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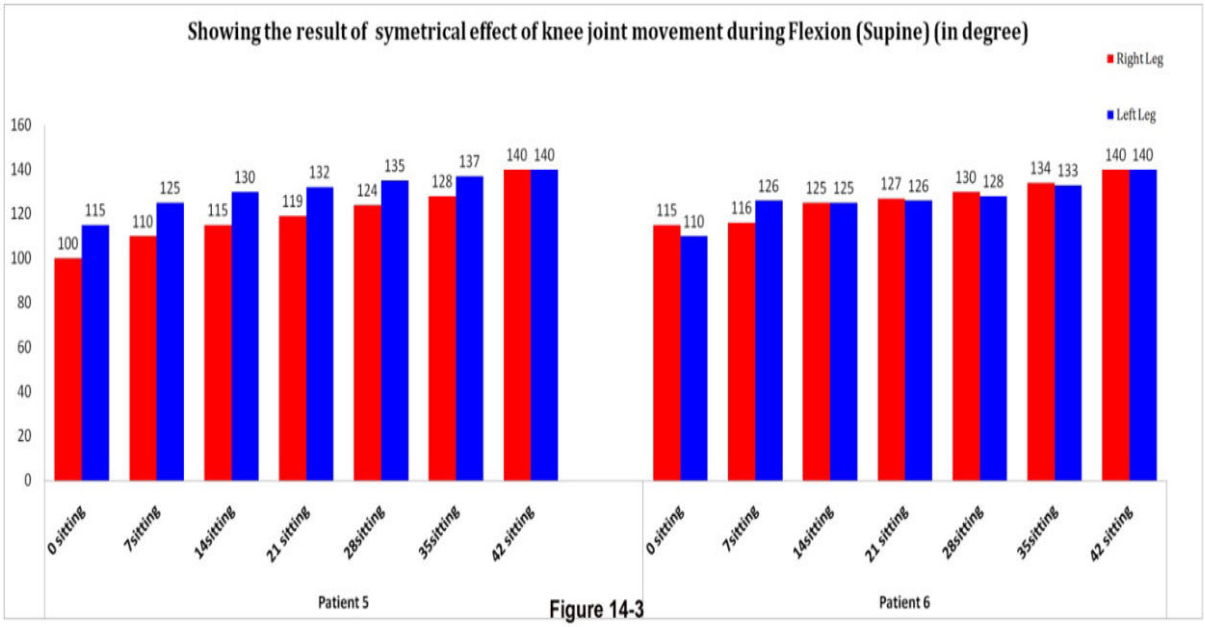


Figure 14-3

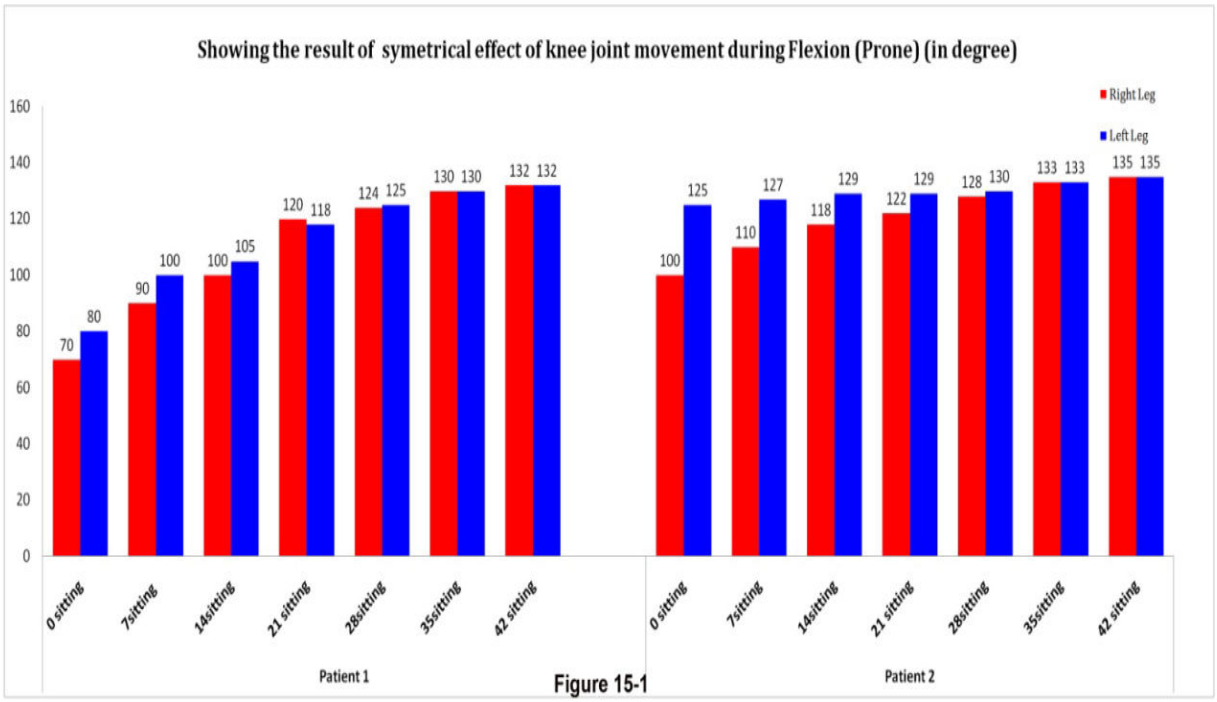
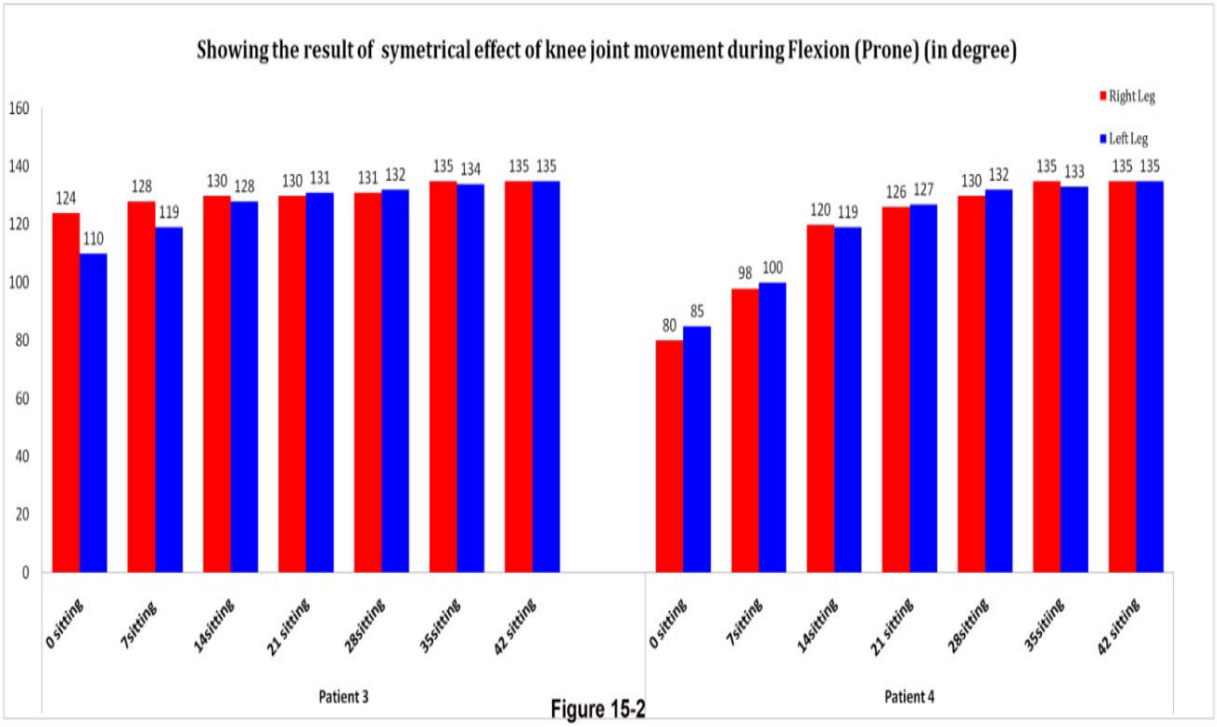


Figure 15-1



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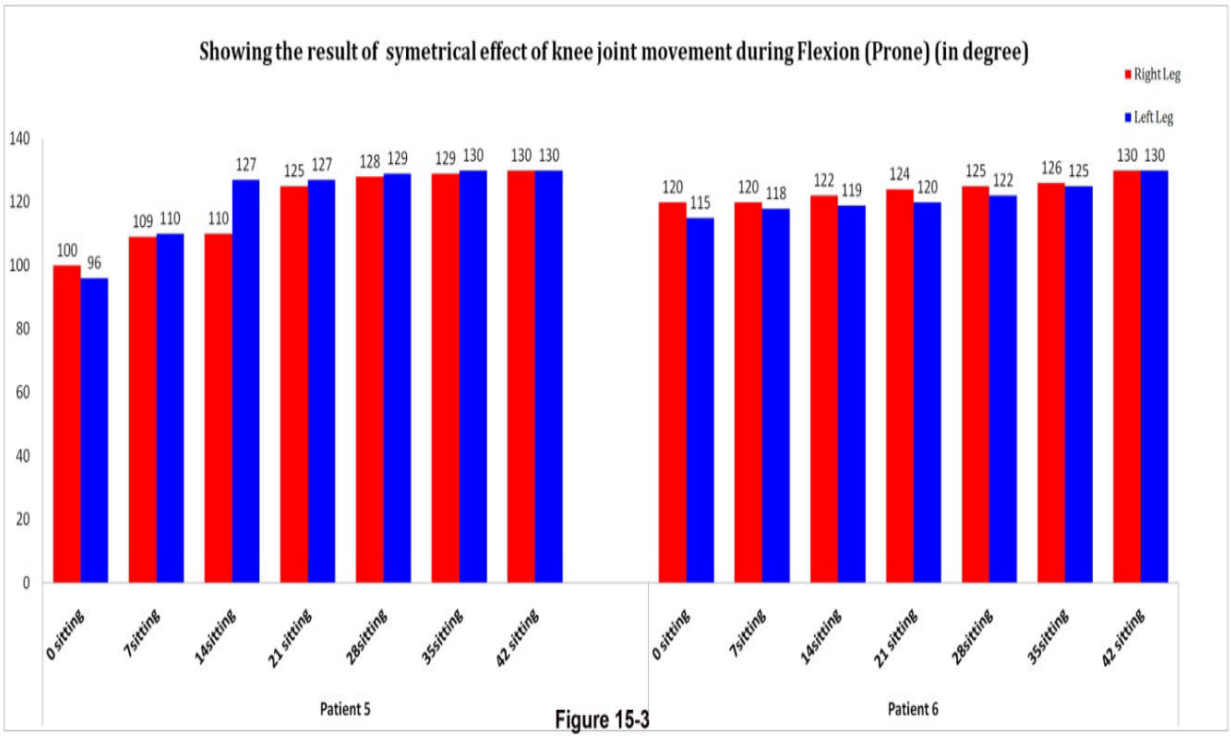


Figure 15-3

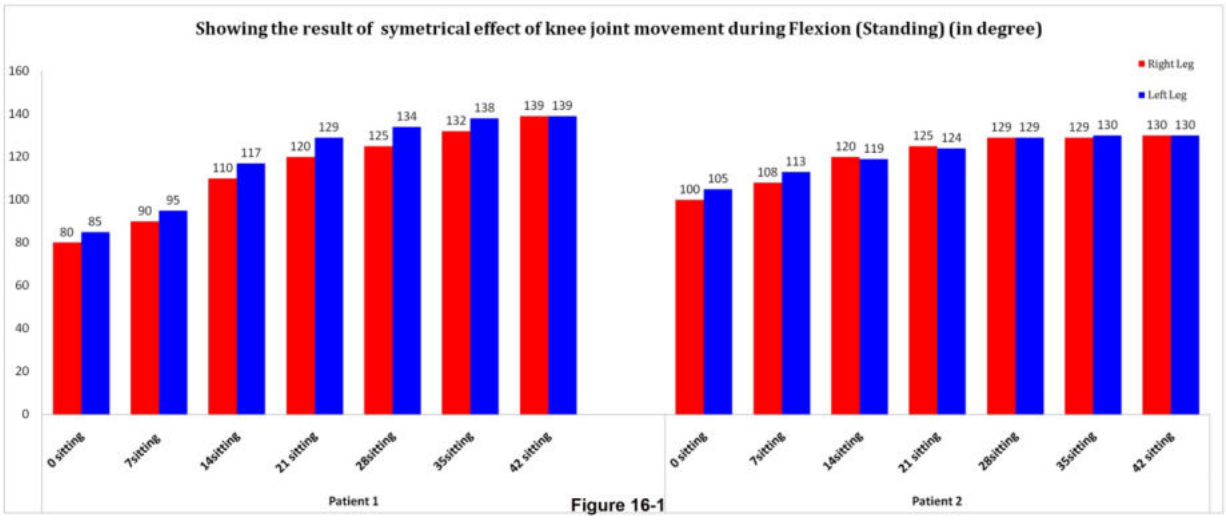


Figure 16-1

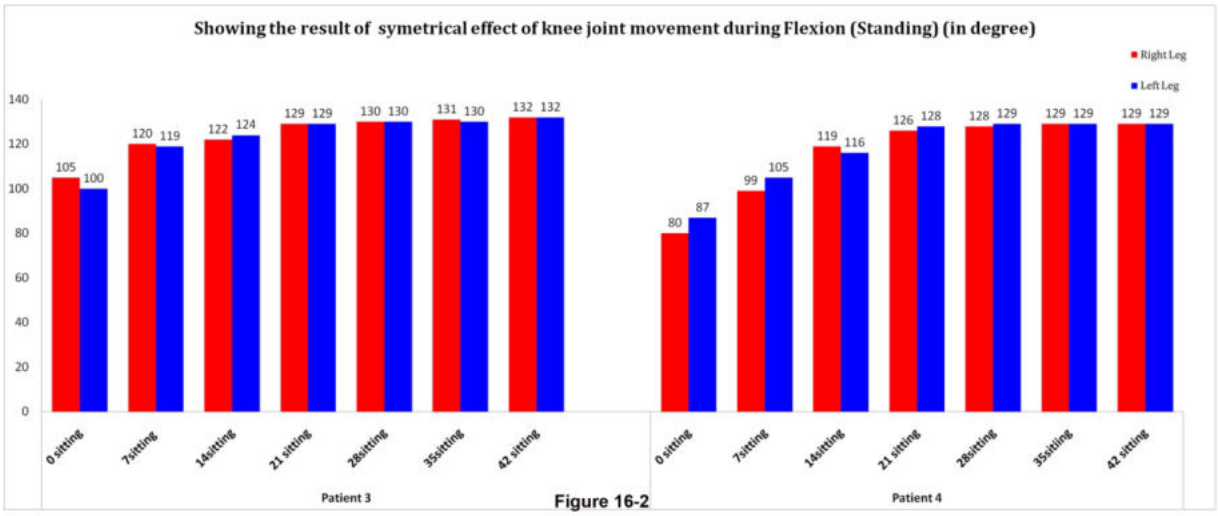


Figure 16-2

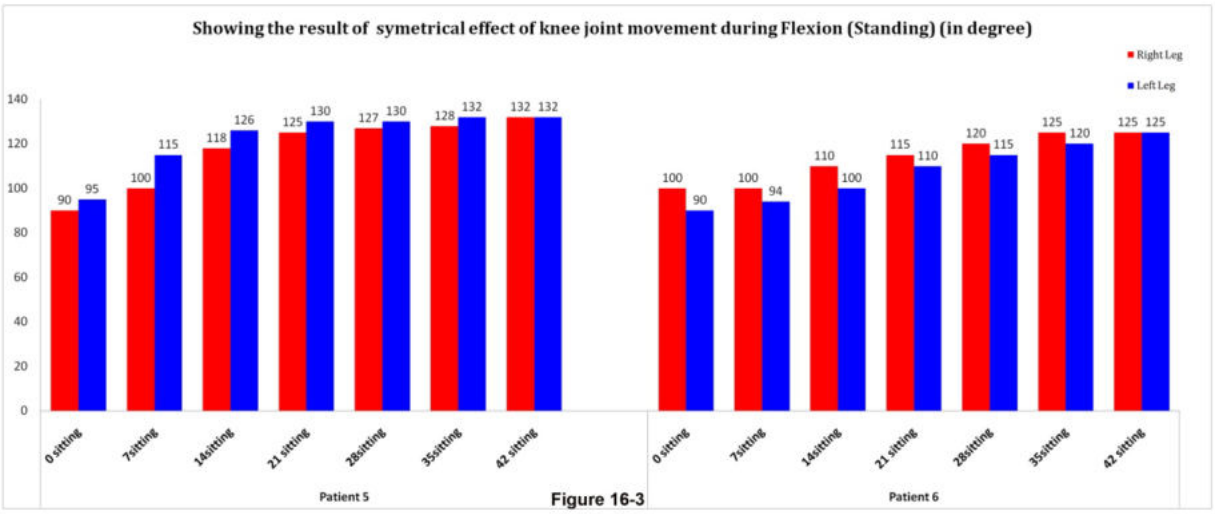


Figure 16-3

Figure (17-18) show radiological photograph of 6 individual above patients, showing marked improvements after 42 days of treatment. (Photography by : X-ray machine – BPL -300mA)

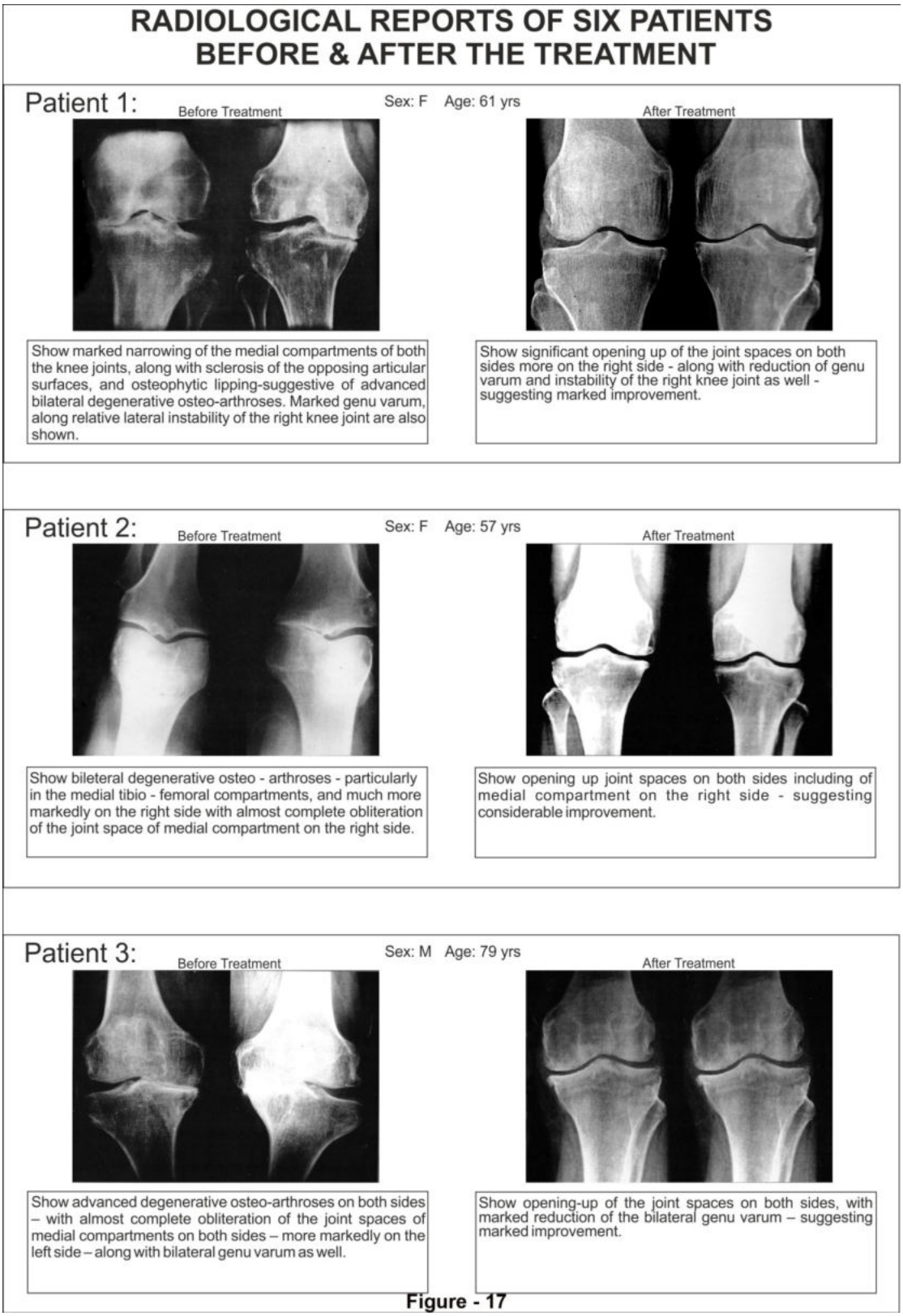


Figure - 17

RADIOLOGICAL REPORTS OF SIX PATIENTS, BEFORE & AFTER THE TREATMENT

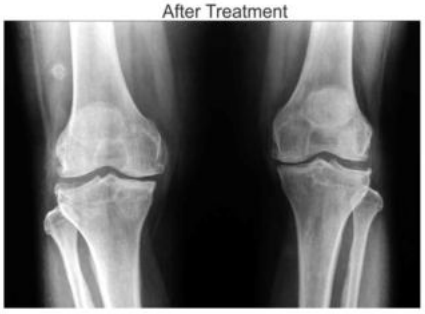
Patient 4:

Sex: F Age: 46 yrs

Before Treatment

Show bilateral degenerative osteo - arthroses - particularly in the medial tibio - femoral compartment - along with genu varum on the right side as well.

After Treatment



Show marked improvement, with opening - up of the joint spaces and reduction of genu varum on right side as well.

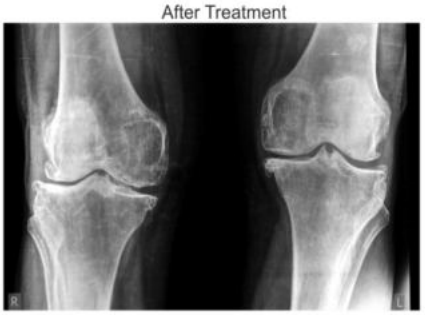
Patient 5:

Sex: F Age: 76 yrs

Before Treatment

Show advanced degenerative osteo-arthoses in both knee joint- involving both the tibio-femoral compartments, and relatively more markedly on the left side- along with lateral instability of the right knee joint, and mild genu varum on the left side as well.

After Treatment



Show marked improvement on both side, with significant opening -up of the joints spaces, and restoration of alignment of the articulating bones.

Patient 6:

Sex: F Age: 54 yrs

Before Treatment

Show advanced bilateral degenerative osteo-arthroses- particularly in the medical tibio-femoral compartments, with marked narrowing of the joints spaces in this compartments, and relatively more markedly on the left side- along with bilateral genu varum as well.

After Treatment

Show significant opening-up of the joints spaces on both sides, along with marked reduction the genu varum as well- suggesting considerable improvement.

Figure - 18

Clinical Findings

Patients who were treated for 42days were also clinically examined. C reactive protein(13) , muscle creatine phosphokinase(14), aldolase(15) are three clinical markers to which are increased in their activities during inflammation were decreased to normal level after 42 days of treatment.

Table –I represents C reactive protein level,of patients of various ages and sex. The increase in activity of C-reactive protein , at the commencement of the treatment was high which was reduced to normal level with 42days of treatment .

C-REACTIVE PROTEIN

(With Titra Method)

PATIENT NO.	SEX	AGE (yrs)	0 DAYS (mg/l)	42 DAYS (mg/l)
1	M	48	8.2	2.4
2	M	55	7.4	2.9
3	M	58	6.8	2.7
4	F	59	5.9	2.8
5	M	63	6.0	2
6	F	64	7.2	2.3
7	F	71	8.1	3.4
8	M	48	8.0	5.6
9	F	55	7.8	3.9
10	M	51	4.9	1.7

Normal upto 6ml/l

Table-II represents activity of muscle creatine phosphokinase of patients of different ages and sex. The activity which was high on the commencement of the treatment day was reduced on 42day of treatment, showing the improvement of knee joit muscles.

MUSCLE CREATINE PHOSPHOKINASE

(UV KINETC, DGKC & IFCC)

DGKC : Deutsche Geselshaft Fur Kinische Chemic

IFCC : International Federation of Clinical Chemistry and Laboratory Medicine

PATIENT NO.	SEX	AGE (yrs)	0 DAYS (u/l)	42 DAYS (u/l)
1	M	48	124	37
2	M	55	85	28
3	M	58	70	30
4	F	59	85	35
5	M	63	133	32
6	F	64	100	33
7	F	71	95	38
8	M	48	120	40
9	F	55	90	39
10	M	51	105	43

Normal upto 29- 133 u/l

Table-III represents activity of enzyme aldolase of patients of different ages and sex. The activity which was high on the commencement of the treatment day was reduced on 42 days of treatment.

ALDOLASE

(Enzymatic with TIM & GDH)

PATIENT NO.	SEX	AGE (yrs)	0 DAYS (u/l)	42 DAYS (u/l)
1	M	48	8.62	2.84
2	M	55	7.52	3.34
3	M	58	6.76	2.14
4	F	59	6.50	2.31
5	M	63	8.42	3.35
6	F	64	7.85	2.95
7	F	71	7.32	2.50
8	M	48	6.95	2.32
9	F	55	6.63	2.25
10	M	51	6.59	2.76

Normal upto 0.30 - 7.60 u/l

Table-IV represents erythrocyte sedimentation rate of patients of different ages and sex. The amounts which were high on the commencement of the treatment day are reduced on 42 days of treatment.

ERYTHROCYTE SEDIMENTATION RATE

(ESR) 1ST hour Westergren Method

PATIENT NO.	SEX	AGE (yrs)	0 DAYS (mm)	42 DAYS (mm)
1	M	48	108	33
2	M	55	90	30
3	M	58	65	17
4	F	59	106	39
5	M	63	95	42
6	F	64	101	38
7	F	71	78	25
8	M	48	88	32
9	F	55	94	37
10	M	51	102	25

Normal <30

Conclusion

Topical application of phytoextracts from Indian medicinal plants for 42 days in osteoarthritis , patients can improve markedly the symmetry of both knees with recovery from pain . This could be a noble method for the treatment of osteoarthritis without involving knee surgery.

Declaration

Treatments of the patients were done with full consent of the patients. Blood samples were collected for diagnosis with full consent of the patients. The treatment protocols were duly approved by institutional bioethics committee.

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